

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (Currently amended) A method of performing branch prediction in a computer program, comprising the steps of:  
identifying a plurality of branch instructions for application code being compiled;  
associating ~~one or more~~ a plurality of hardware counters with ~~one or more~~ the plurality of branch instructions;  
using the ~~one or more~~ plurality of hardware counters ~~to autonomically counting~~ count all of the plurality of branch instructions that are executed in parallel to generate a plurality of branch statistics;  
predicting branches to be taken using the plurality of branch statistics to form branch predictions;  
and  
prefetching the plurality of branch instructions using the plurality of branch predictions.
2. (Currently amended) The method of claim 1, wherein the ~~one or more~~ plurality of branch instructions are associated with ~~one or more~~ the plurality of branch statistics, and wherein the plurality of branch statistics are stored in ~~one or more~~ a plurality of branch statistic fields.
3. (Currently amended) The method of claim 2, wherein the plurality of branch statistic fields store a plurality of data on an associated branch instruction, wherein a first datum of the plurality of data is accessed for branch prediction when the program is in a first mode, and wherein a second datum of the plurality of data is accessed for branch prediction when the program is in a second mode.
4. (Currently amended) The method of claim 2, wherein the plurality of branch statistic fields include a branch count per instruction field that represents the number of times a branch is taken for that branch instruction.
5. (Original) The method of claim 1, wherein upon occurrence of a predetermined event, the computer program switches branch prediction operating modes on a conditional branch instruction.

6. (Currently amended) The method of claim 1, wherein the plurality of branch statistics are stored in a performance instrumentation shadow cache.
7. (Original) The method of claim 1, wherein branches per instruction are counted during execution of the computer program.
8. (Currently amended) A ~~computer system~~ branch prediction apparatus, comprising:  
a compiler that identifies a plurality of branch instructions for application code being compiled;  
one or more a plurality of hardware counters associated with one or more the plurality of branch instructions of a program the application code;  
a plurality of branch statistic fields for storing a plurality of branch statistics associated with the one or more plurality of branch instructions;  
wherein when a branch instruction in the plurality of branch instructions is executed in the program application code, a hardware counter of the one or more plurality of hardware counters autonomically counts all of the plurality of branch instructions that are executed and updates in parallel [[a]] branch statistic statistics in [[a]] the plurality of branch statistic [[field]] fields;  
a processor that predicts branches to be taken using the plurality of branch statistics to form branch predictions; and  
the processor prefetches the plurality of branch instructions using the branch predictions.
9. (Currently amended) The ~~system apparatus~~ of claim 8, wherein the plurality of branch statistics are used to make branch predictions in the ~~program application code~~.
10. (Currently amended) The ~~system apparatus~~ of claim 8, further comprising a plurality of operating modes of the ~~program application code~~, wherein for a first branch instruction, an associated branch statistics field stores first branch statistics for a first mode of the plurality of operating modes and second branch statistics for a second mode of the plurality of operating modes.
11. (Currently amended) The ~~system apparatus~~ of claim 8, wherein the plurality of branch statistic fields include a branch count per instruction field that represents the number of times a branch is taken for that branch instruction.

12. (Currently amended) The ~~system apparatus~~ of claim 8, wherein upon occurrence of a predetermined event, the program switches branch prediction operating modes on a conditional branch instruction.
13. (Currently amended) The ~~system apparatus~~ of claim 8, wherein the plurality of branch statistics are stored in a performance instrumentation shadow cache.
14. (Currently amended) The ~~system apparatus~~ of claim 8, wherein branches per instruction are counted during execution of the program.
15. (Currently amended) A computer program product in a recordable-type computer readable medium, comprising:  
instructions for identifying a plurality of branch instructions for application code being compiled;  
[[first]] instructions for associating ~~one or more~~ a plurality of hardware counters with ~~one or more~~ the plurality of branch instructions;  
~~using the one or more hardware counters, second~~ instructions for autonomically counting all of the plurality of branch instructions that are executed in parallel using the plurality of hardware counters to thereby generate a plurality of branch statistics;  
[[third]] instructions for predicting branches to be taken using the plurality of branch statistics to form branch predictions; and  
instructions for executing the application code using the branch predictions.
16. (Currently amended) The computer program product of claim 15, wherein the ~~one or more~~ plurality of branch instructions are associated with ~~one or more~~ the plurality of branch statistics, and wherein the plurality of branch statistics are stored in ~~the one or more~~ a plurality of branch statistic fields.
17. (Currently amended) The computer program product of claim 16, wherein the plurality of branch statistic fields store a plurality of data on an associated branch instruction, wherein a first datum of the plurality of data is accessed for branch prediction when the program is in a first mode, and wherein a second datum of the plurality of data is accessed for branch prediction when the program is in a second mode.

18. (Currently amended) The computer program product of claim 16, wherein the plurality of branch statistic fields include a branch count per instruction field that represents the number of times a branch is taken for that branch instruction.

19. (Original) The computer program product of claim 15, wherein upon occurrence of a predetermined event, the computer program switches branch prediction operating modes on a conditional branch instruction.

20. (Currently amended) The computer program product of claim 15, wherein the plurality of branch statistics are stored in a performance instrumentation shadow cache.

21. (Original) The computer program product of claim 15, wherein branches per instruction are counted during execution of the computer program.